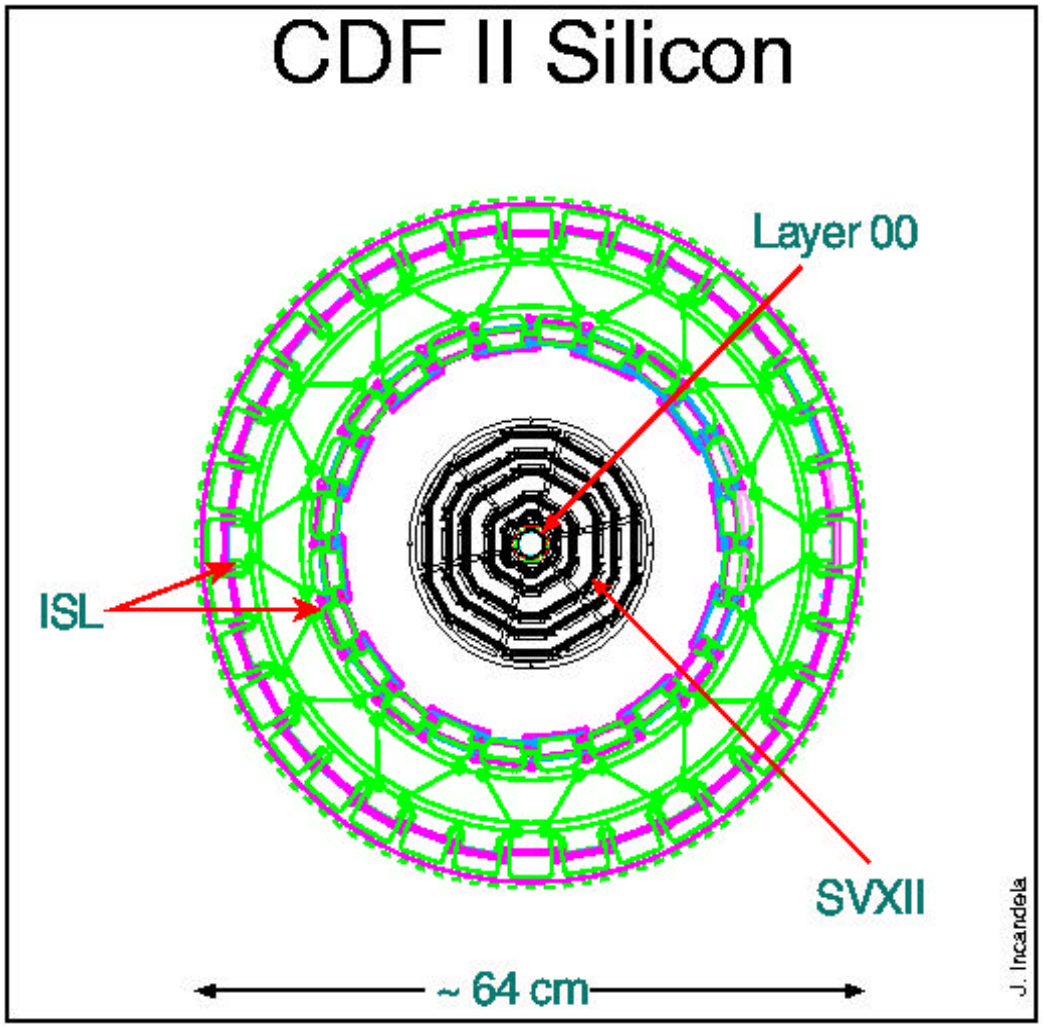
What ***You*** should know about the Silicon

- Introduction
- Monitoring
- Problems
- Responsibilities

Introduction



- L00 (1 layer)
  - R = 1.35-1.65 cm
  - 13824 channels
- SVX (5 layers)
  - R = 2.5-10.6 cm
  - 405504 channels
- ISL (2 layers)
  - R = 20-28 cm
  - 303104 channels

Total: 722432 chnls

➢ Share same DAQ architecture

Introduction

The silicon detector can be permanently damaged by:

A. Powering (STDBY or ON) without adequate cooling
B. Large charge deposits (from unstable beam) while ON
C. Incorrectly powering

We minimize chances of incurring such damage by:

A. Employing PLCs to monitor status of silicon cooling
B. Employing various loss monitors to determine beam stability
C. Employing “clever” monitoring/control software

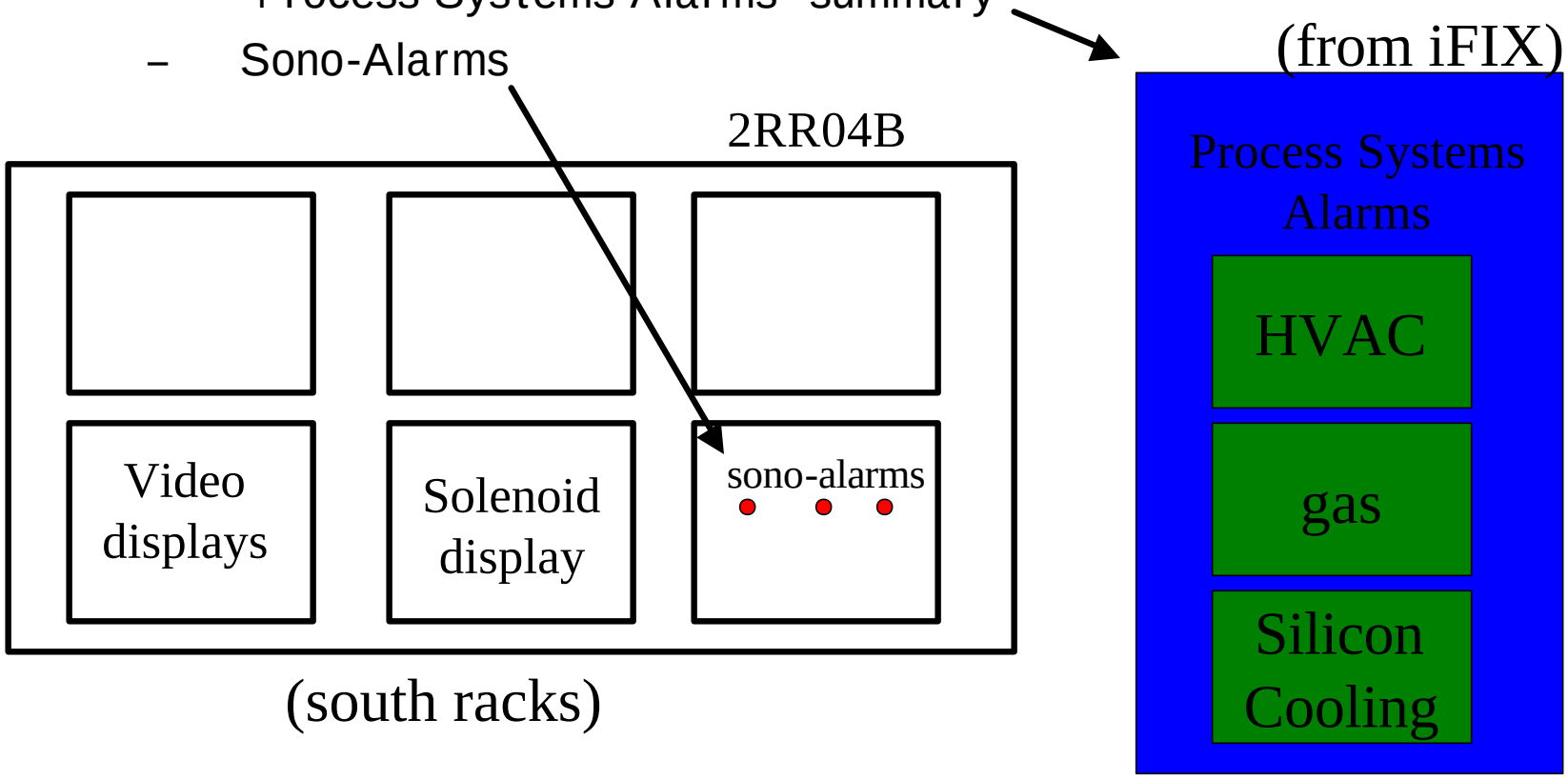
And as a final mitigating factor:

We rely on YOU to help quickly spot potential dangers.

Monitoring

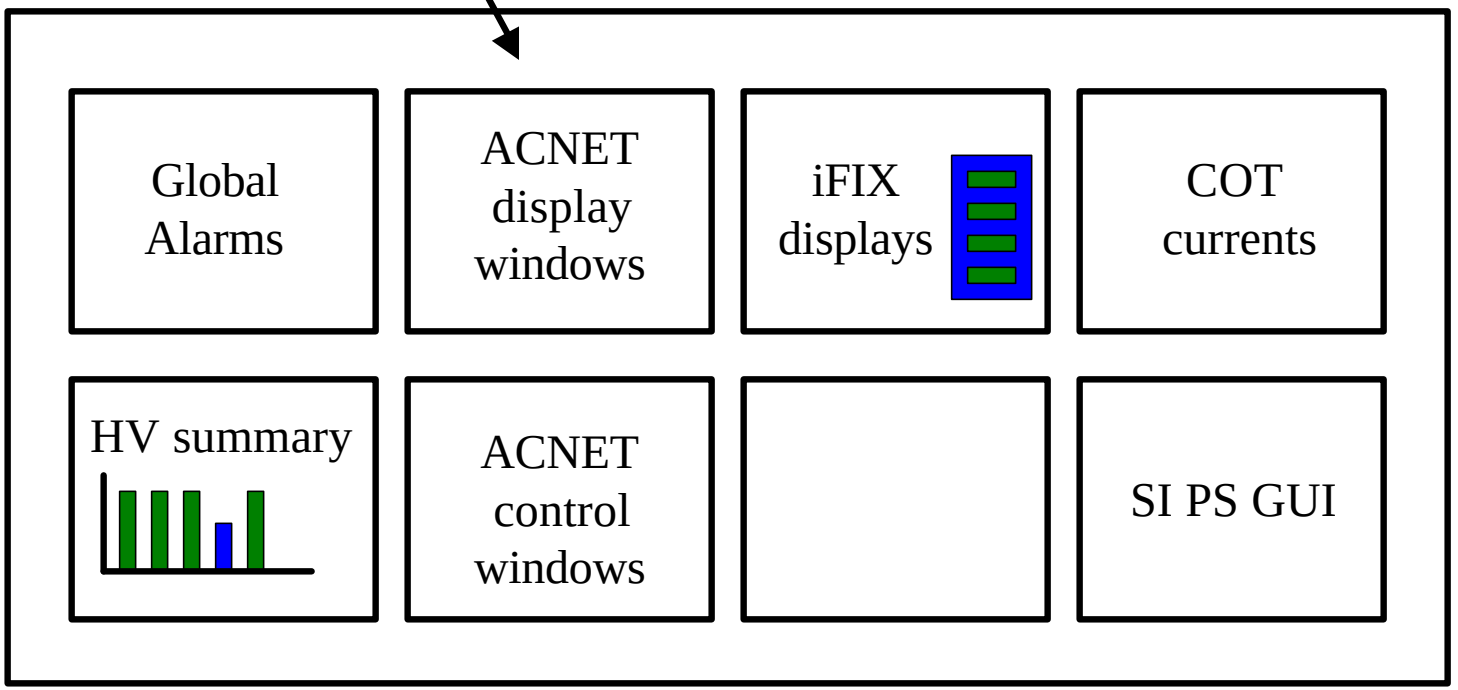
There is information available from a variety of places:

A. Silicon Cooling… overall status from
   - "Process Systems Alarms" summary
   - Sono-Alarms



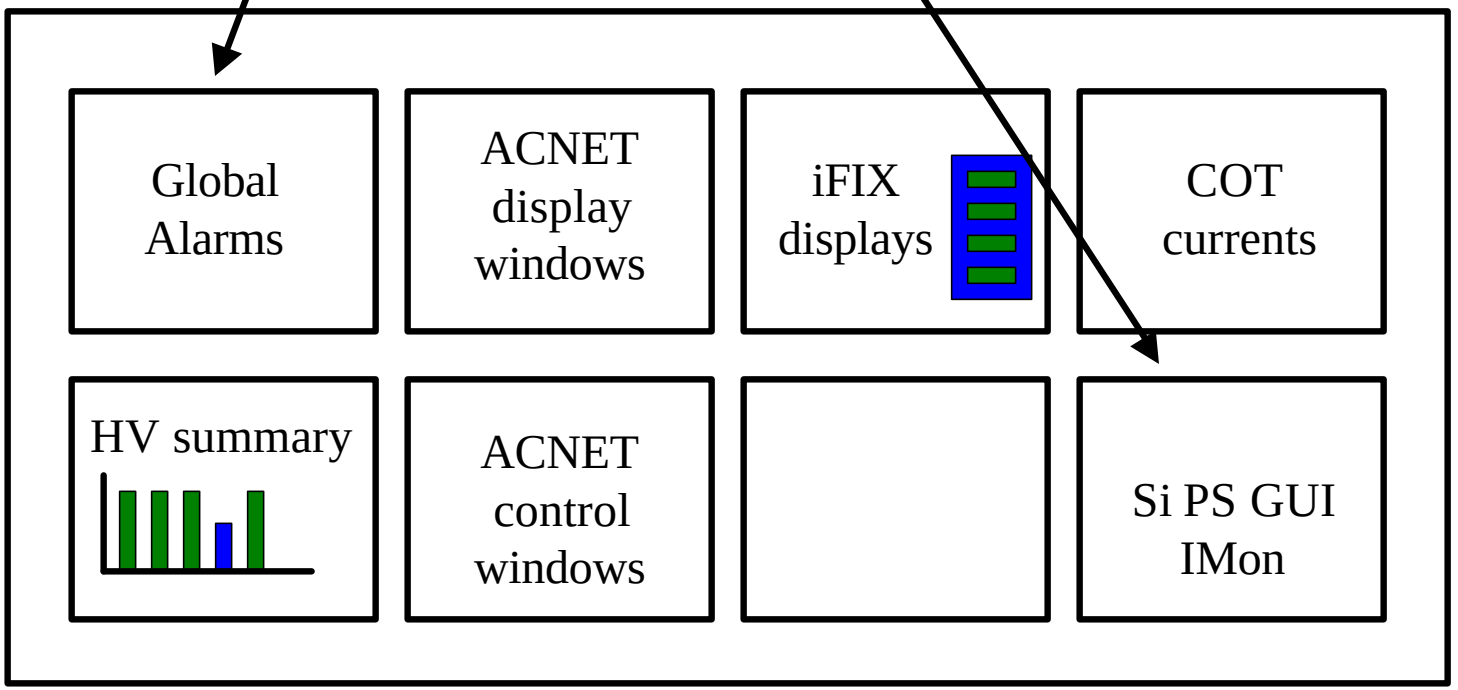
Monitoring

B. Beam losses from ACNET
   - LOSTP and LOSTPB
   - SVXRAD plots



Monitoring

C. Power status
- Silicon Power Supply Control GUI
- HV Summary and Global Alarms



Monitoring

IF Silicon Cooling .and. sono-alarms (quiet)

- Cooling in good shape

IF LOSTP/LOSTPB <30 kHz/each .and. no spikes >40 kHz .and. SVXRAD flat

- TeV beams are stable

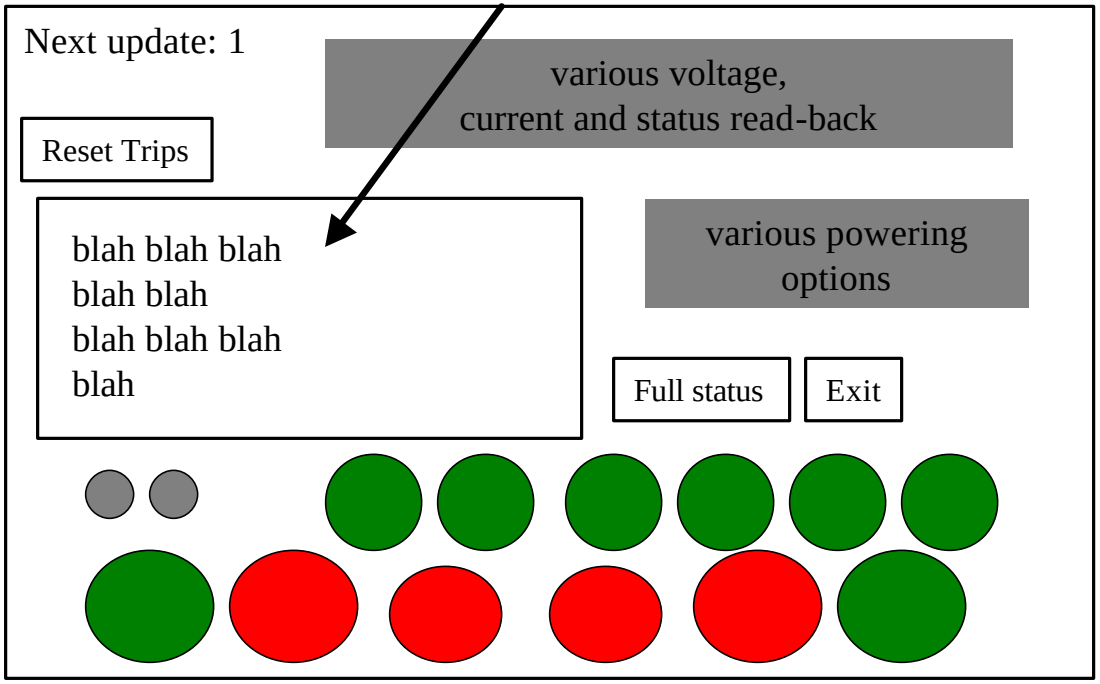
IF L00 .and. SVX .and. ISL on Global Alarms Sum'ry

- Powered wedges OK

Problems

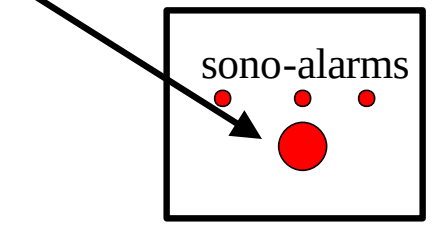
IF Silicon Cooling .or. sono-alarms (LOUD)

- Page 218.8227 (main pgr)
- Page 218.8626 (interlock pgr)
- Check GUI message window…



IF persistent (1 or 2 ok) "ALERT" .or. "ILLEGAL" messages (check time stamp):

Hit the Silicon Rack Power Crash Button

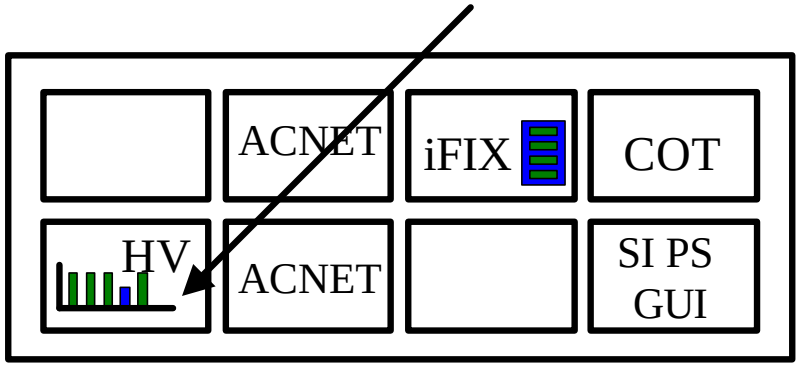


Problems

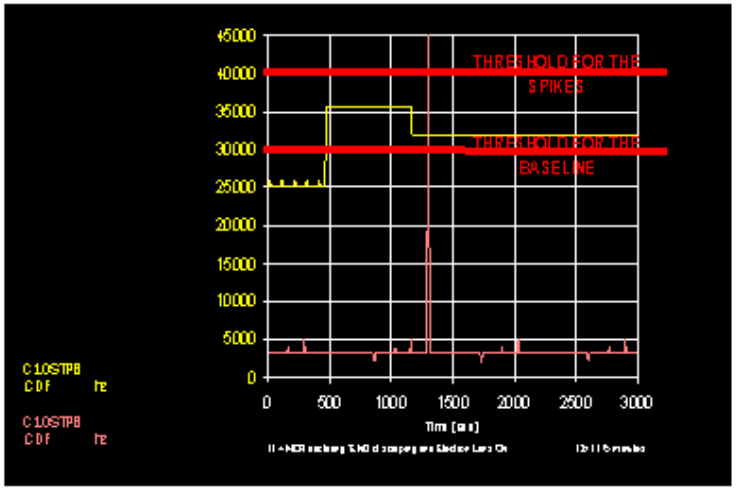
For SVXRAD plots, follow RADMon run rules

IF either LOSTP or LOSTPB >30 kHz .or. spikes >40 kHz *or otherwise indicate unstable beam conditions*
(during shift, use lumberjack plotter to track history of losses over course of present store) :

- Ask SciCo to notify MCR (nearly always results in marked improvement within about 30-40 minutes)
- If losses persist, or worsen: page 218.8227
- If you fear for safety of silicon: use HV Summary button to bring to STDBY (will take few minutes)



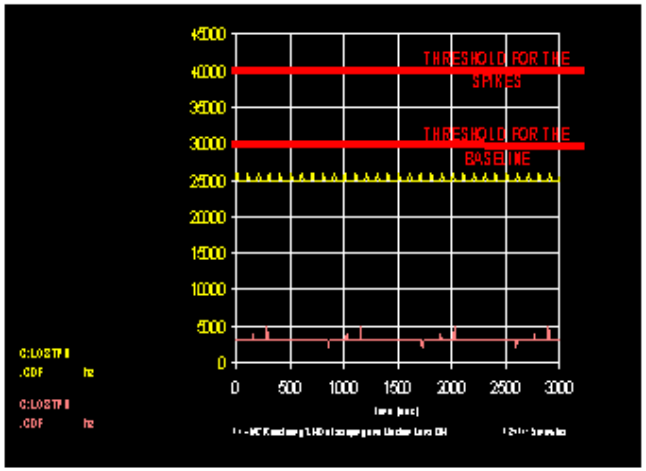
Know Losses Policy (Posted in CR)



Silicon LOSS Policy

BAD LOSSES
Baseline bigger than 30,000 Hz
OR
Spikes Bigger than 40,000 Hz

GOOD LOSSES (at least 5 minutes)
Baseline smaller than 30,000 Hz
AND
Spikes Smaller than 40,000Hz



Problems

IF L00 .or. SVX .or. ISL on Global Alarms Sum'ry

- Sometimes will clear themselves… otherwise:
- Page 218.8227
- expert will either take care of it themselves, or, they may coach the Monitoring Ace through recovery

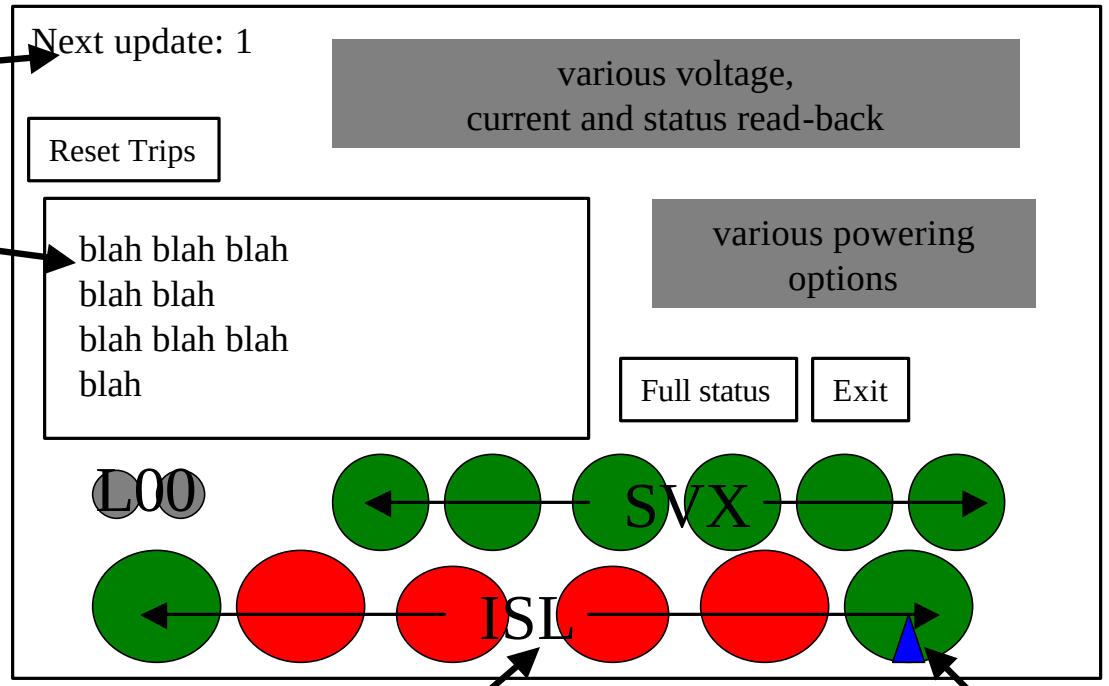
IF SI PS GUI stops Updating:

- Occasionally (1-2/shift) check that "Update" is counting down
- Be patient, gets "stuck" on "1" for 5-10s sometimes
- If recently changed voltage state (e.g. turned to STBY or ON), wait ~5 minutes and check again
- If really "stuck", follow directions to restart

(they're taped above the GUI screen)

Quick SI-PS-GUI Tutorial

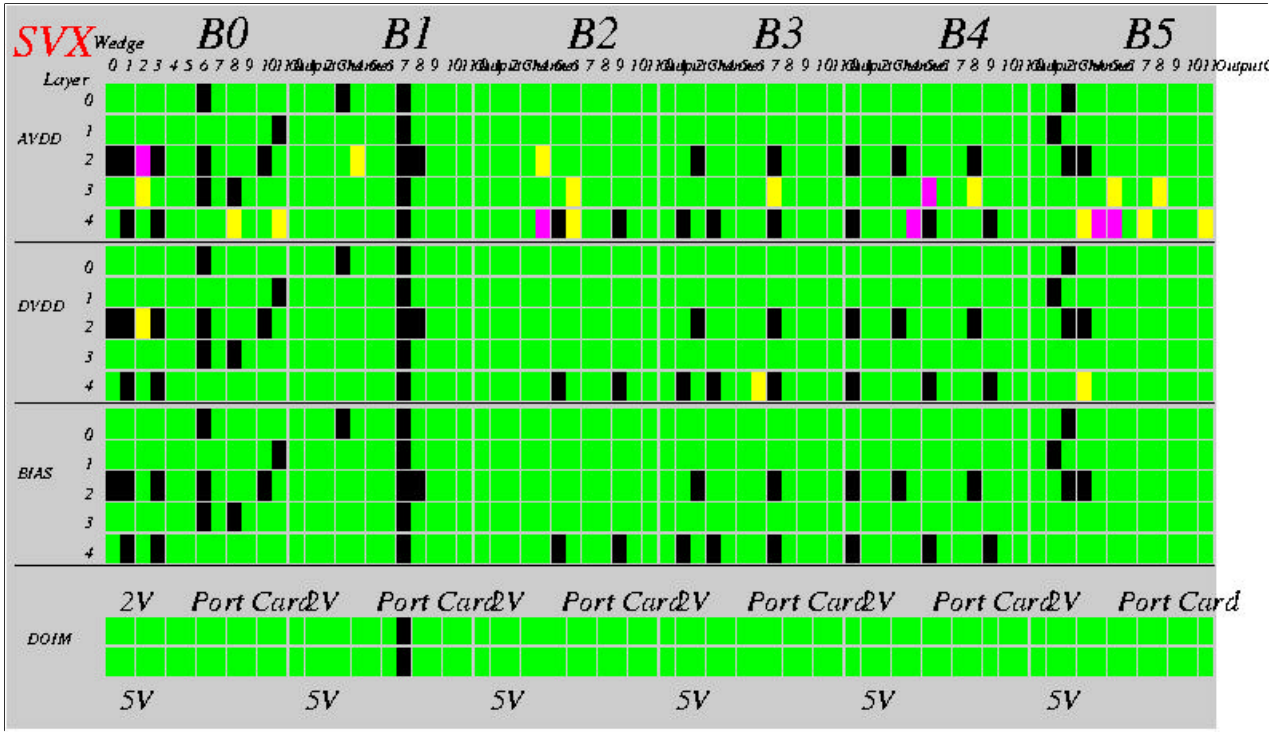
Labels: DBbWw-Ll (e.g. SB2W3-L3 = SVX brl-2 wdg-3 lyr-3)
D: S=SVX, I=ISL, L=L00 B: barrel number (0-5)
W: wedge number (0-11) L: layer number (0-4)



Only use GUI when coached by expert!

Quick IMon Tutorial

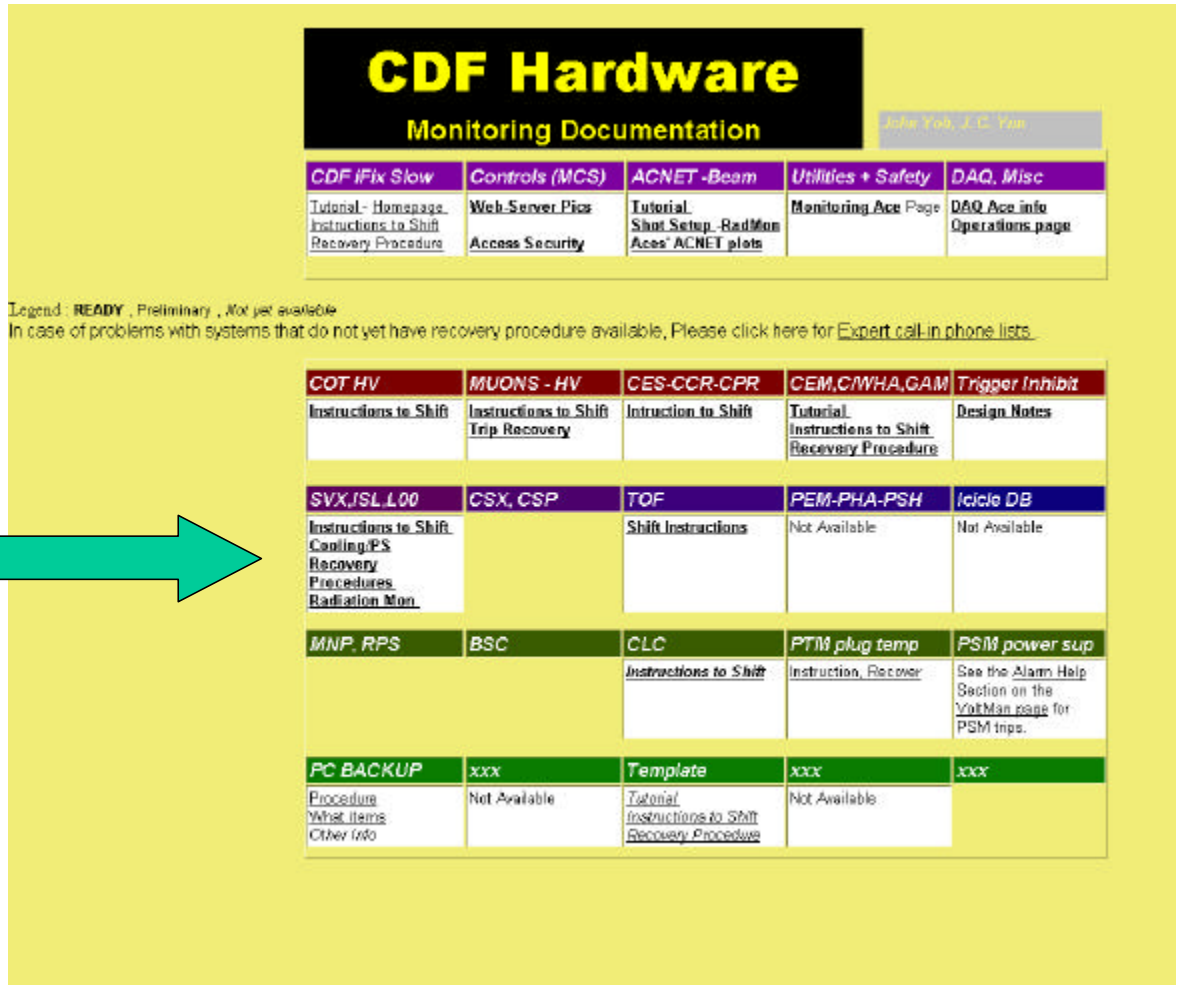
- Tracks currents for experts by color:
  - GREEN = Normal
  - YELLOW = Warning
  - PINK = Alert
  - RED = Trip
  - BLACK = Not Powered
- required by ACE (for now)



Web Documentation

www-b0.fnal.gov:8000/mcs/mondoc.html

Silicon



CDF Hardware

Monitoring Documentation

John Yoh, J.C. Yun

CDF iFix Slow	Controls (MCS)	ACNET -Beam	Utilities + Safety	DAQ, Misc
Tutorial - Homepage Instructions to Shift Recovery Procedure	Web Server Pics Access Security	Tutorial Shot Setup RadMon Aces' ACNET plots	Monitoring Ace Page	DAQ Ace info Operations page

Legend : **READY** , Preliminary , *Not yet available*

In case of problems with systems that do not yet have recovery procedure available, Please click here for Expert call-in phone lists

COT HV	MUONS - HV	CES-CCR-CPR	CEM,CMHA,GAM	Trigger Inhibit
Instructions to Shift	Instructions to Shift Trip Recovery	Intruction to Shift	Tutorial Instructions to Shift Recovery Procedure	Design Notes

SVX,ISL,L00	CSX, CSP	TOF	PEM-PHA-PSH	Icicle DB
Instructions to Shift Cooling/PS Recovery Procedures Radiation Mon		Shift Instructions	Not Available	Not Available

MNP, RPS	BSC	CLC	PTM plug temp	PSM power sup
		Instructions to Shift	Instruction, Recover	See the Alarm Help Section on the VoltMan page for PSM trips.

PC BACKUP	xxx	Template	xxx	xxx
Procedure What items Other info	Not Available	Tutorial Instructions to Shift Recovery Procedure	Not Available	

b0.fnal.gov:8000/~svxii/runii/ace_mon.htm

CDF RUN II COMMISSIONING

Recovery Procedures for Silicon Cooling/Power

Note: in what follows, "Alarm List" refers to the iFix page that pops up when the "D" button on the Global Alarms page is clicked. Clicking the box that says "SVX," "ISL," or "L00" pops up something called an iFix Alarm Summary Object, which is a lot like an alarm list, except that it sucks.

1. **POWER SUPPLY TRIP**

   Symptom: A box goes red and tweets. IN ADDITION, the bars and status box on the HV summary page go red.

   What should you do? Check the Alarm List. From there you will be able to read what ladder has tripped (B1W2 L3, for a random example). Page 218.8227 armed with this information and the expert will help you recover. *Note: if, after recovery, the iFix alarms haven't cleared, try clicking "Reset Trips in CAEN" on the PS GUI.*

2. **COOLING PROBLEMS/INTERLOCK TRIP**

   Symptom: These are signalled by either of the following:

   1. The "SILICON Cooling" box on the iFix "Process Systems ALARMS" page goes red and LOUD sirens blare (can only be silenced by the cryo techs)
   2. The silicon sono-alarms (located on the patch panel in rack 2RR04B) emit a loud, sustained, annoying beep (can be silenced by flipping the switch beneath them)

   What should you do? The VERY FIRST THING YOU SHOULD DO is check the silicon PS GUI. If it is stuck (i.e. not counting down, see below), or if it is spewing out LOTS of messages like "ALERT" or "ILLEGAL," then **hit the Silicon Rack Power Crash Button** located underneath the sono-alarms.

   In any event, page 218.8227 and the on-call cooling/interlock expert at 218.8626. They will help you recover. At the end of it all, make sure the sono-alarm switches are returned to "NOT SILENCED" and the cryo techs have unsilenced the Process Systems alarms.

   Note: A non-severe cooling problem can be signalled by a red (or yellow) tweety iFix alarm that is not accompanied by a sono-alarm or a Process Systems alarm. These are rare enough that we would like you to page the on-call cooling/interlock expert at 218.8626 so we can understand the problem.

3. **LOSS OF HV MONITORING**

   Symptom: ALL THREE silicon boxes (SVX/ISL/L00) go red and tweet at the same time. The Alarm List shows "GUI/iFix communication NOT OK." After some amount of time (could be seconds, could be minutes), the three silicon heartbeat boxes on the HV summary page go purple.

   What should you do? Check the silicon PS GUI and see if it is updating (look in the upper left corner of the window where it says "next update." It should count down from 7, stop for a few seconds at 1, then start counting down again). If it seems to be stuck,

   1. Wait a little longer, like 30 seconds. If you have just recently turned a bunch of power supplies on or off, wait even longer, like 5 minutes.
   2. If it's still stuck, restart the GUI by following these instructions (also posted on the GUI PC -- and they ought to be identical!)
   3. If the GUI does not restart gracefully, page the GUI expert at 266.0555.
   4. If the GUI restarted OK, the alarms should disappear. If they remain, or if the GUI never seemed to be stuck in the first place, page the on-call cooling/interlock expert at 218.8626. S/he will either take care of it or tell you how to take care of it.

4. **LOSS OF ALARM MONITORING**

nent: Done (0.391 secs)

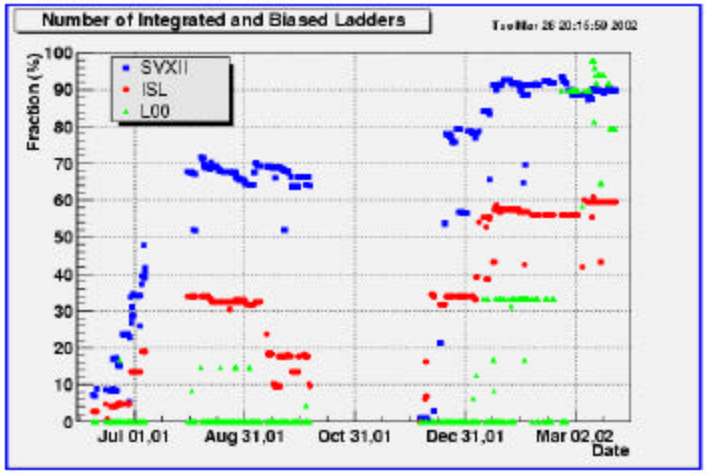
www-cdf.fnal.gov/internal/silicon/scc.html

CDF RUN II COMMISSIONING

Silicon Commissioning and Operations

Organizational authority for the silicon projects passed from the construction projects to operations when the Run2 silicon detector was installed inside the COT. The commissioning and operation of the silicon system in run 2 are organized as part of the operations group headed by Mike Lindgren and Jeff Spalding.

The current SPLs (subproject leaders) for silicon are Gino Bolla, and Chris Hill.



As can be seen from the plot of integated ladders above, much progress has been made in commissioning the silicon. The commissioning, however, is not yet complete. A lot of work remains to be done to address the following problems with the silicon:

- SVXII has many holes in its coverage.
- SVXII is not yet stable in its operation.
- ISL central cooling blockage needs to be removed and its ladders commissioned.
- L00 needs to be commissioned.

Working groups (headed by WGLs) have been formed to focus work on specific silicon issues.

- Detector Working Group (WGL is Lester Miller)
- DAQ Working Group (WGL is Steve Nahn)
- PS/Interlock Working Group (WGL is Andy Hocker)
- Calibrations Working Group (WGL is Jason Nielsen)
- Monitoring Working Group (WGL is Saverio D'Auria)

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Who to Call?

CDF RUN II COMMISSIONING

Silicon Pager Numbers

System	Pager Number
Main Silicon	218-8227
Silicon (Gino Bolla)	218-9520
Silicon (Chris Hill)	218-8940
Cooling/Interlocks	218-8626
Rad-Co	266-2713
DAQ (Lester Miller)	218-9611
DAQ (Steve Nahn)	722-7483
L00 (Dave Stuart)	722-7565
PS GUI	266-0555
Power Supplies	314-0128

CDF Monitoring Ace Silicon Instructions

As a monitoring ace, your silicon responsibities are to:

1.MONITOR BEAM stability. Take action as prescibed by Silicon Loss Policy stated below:

- IF either LOSTP or LOSTPB exceeds 30 kHz
  OR either has spikes which exceed 40 kHz
  OR there is other indication of unstable beam conditions:
  - Page 218-8227 (main silicon pager)
  - Ask SciCo to notify MCR

2.CONTACT SILICON expert after scraping is complete to raise HV.

- Page 218-8227 (main silicon pager)
- Put ACNET beam losses plot in e-log
- Be prepared to run the cratematch perl script.
  - Open a terminal window on b0dap42 and type the following:
    1. cd ~svxii
    2. ./cratematch.pl
  - If all is well, result should be "* * * Silicon is Ready to Cold Start! * * *"

3.REACT to loud noises and/or non-green color from IFix.

- Be familiar with and follow the following specific recovery procedures:
  - Power supply alarm/trip
  - Cooling problems/interlock trip
  - Loss of HV monitoring
  - Loss of alarm monitoring
  - "Alarm: Heartbeat"
  - Trigger inhibit
- **KNOW what to do in the event of a radiation abort.**

Recovery Procedures for Silicon Cooling/Power I

1.POWER SUPPLY TRIP

2.Symptom: A box goes red and tweets. IN ADDITION, the bars and status box on the HV summary page go red.

3.What should you do? Check the Alarm List. From there you will be able to read what ladder has tripped (B1W2 L3, for a random example). Page 218.8227 armed with this information and the expert will help you recover. *Note: if, after recovery, the iFix alarms haven't cleared, try clicking "Reset Trips in CAEN" on the PS GUI.*

4.COOLING PROBLEMS/INTERLOCK TRIP

5.Symptom: These are signalled by either of the following:

1. The "SILICON Cooling" box on the iFix "Process Systems ALARMS" page goes red and LOUD sirens blare (can only be silenced by the cryo techs)
2. The silicon sono-alarms (located on the patch panel in rack 2RR04B) emit a loud, sustained, annoying beep (can be silenced by flipping the switch beneath them)

6.What should you do? The VERY FIRST THING YOU SHOULD DO is check the silicon PS GUI. If it is stuck (i.e. not counting down, see below), or if it is spewing out LOTS of messages like "ALERT" or "ILLEGAL," then **hit the Silicon Rack Power Crash Button** located underneath the sono-alarms.

7. In any event, page 218.8227 and the on-call cooling/interlock expert at 218.8626. They will help you recover. At the end of it all, make sure the sono-alarm switches are returned to "NOT SILENCED" and the cryo techs have unsilenced the Process Systems alarms.

8.Note: A non-severe cooling problem can be signalled by a red (or yellow) tweety iFix alarm that is not accompanied by a sono-alarm or a Process Systems alarm. These are rare enough that we would like you to page the on-call cooling/interlock expert at 218.8626 so we can understand the problem.

Recovery Procedures for Silicon Cooling/Power II

LOSS OF HV MONITORING

1. *Symptom:* ALL THREE silicon boxes (SVX/ISL/L00) go red and tweet at the same time. The Alarm List shows "GUI/iFix communication: NOT OK." After some amount of time (could be seconds, could be minutes), the three silicon heartbeat boxes on the HV summary page go purple.
2. *What should you do?* Check the silicon PS GUI and see if it is updating (look in the upper left corner of the window where it says "next update." It should count down from 7, stop for a few seconds at 1, then start counting down again). If it seems to be stuck,
    1. Wait a little longer, like 30 seconds. If you have just recently turned a bunch of power supplies on or off, wait even longer, like 5 minutes.
    2. If it's still stuck, restart the GUI by following these instructions (also posted on the GUI PC -- and they ought to be identical!)
    3. If the GUI does not restart gracefully, page the GUI expert at 266.0555.
    4. If the GUI restarted OK, the alarms should disappear. If they remain, or if the GUI never seemed to be stuck in the first place, page the on-call cooling/interlock expert at 218.8626. S/he will either take care of it or tell you how to take care of it.
3. **LOSS OF ALARM MONITORING**
4. *Symptom:* Little "H" box for SVX/ISL/L00 on Global Alarms page goes purple and stays that way for > 5 min. May also be accompanied by a voice alarm, I don't know.
5. *What should you do?* Page the on-call cooling/interlock expert at 218.8626. S/he will either take care of it or tell you how to take care of it.
6. **"ALARM: HEARTBEAT"**
7. *Symptom:* Some or all of the silicon heartbeat boxes go purple, but everything else seems OK.
8. *What should you do?* If it clears within, say, five minutes, don't worry about it. If it doesn't clear itself, page the on-call cooling/interlock expert at 218.8626. S/he will either take care of it or tell you how to take care of it.
9. **TRIGGER INHIBIT**
10. *Symptom:* The DAQ ace wanders over to your side of the room complaining about a SVX/ISL/L00 trigger inhibit. Since the most likely cause of inhibits are trips, this wil probably be redundant with all the symptoms of a power supply trip; see above. However, there may be cases where the inhibit is the result of something more mysterious.
11. *What should you do?* Page 218.8227. *Handy tip: if you check the iFix Trigger Inhibit Status page, you can determine which ladder is causing the inhibit and impress the silicon expert with your wicked-awesome Monitoring Ace skills.*

Conclusion

Your main responsibility to silicon is to help keep it **safe**.

When in doubt, page 218.8227…

if no response, turn it to STANDBY

(or OFF if cooling problem).